Attorney Docket No.: 4887.204-US PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Andersen et al. Confirmation No: 7632

Serial No.: 09/261,329 Group Art Unit: 1652

Filed: March 3, 1999 Examiner: E. Slobodyansky

For: Cellulase Variants

EXPRESS MAIL CERTIFICATE

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Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I hereby certify that the attached correspondence comprising:

1. Transmitttal of Appeal Brief (in duplicate)
2. Brief on Appeal and a copy of pending claims (in triplicate)
3. Copy of Patent (in triplicate)

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" under 37 C.F.R. 1.8(a) on the date indicated above and is addressed to the address indicated above.

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Lourdes Ayala
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8-4-04

IFW AF/1652

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TRANSMITTAL OF APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Transmitted herewith in triplicate is an Appeal Brief in this application. The required fee for submitting an appeal brief is estimated to be $330.

Applicant hereby petitions for an extension of time under 37 CFR 1.136 for 3 months. If an additional extension of time is required, please consider this a petition therefor. The required extension fee is estimated to be $950.

Please charge the required extension and appeal fees, estimated to be $1280, to Novozymes North America, Inc., Deposit Account No. 50-1701. A duplicate of this sheet is enclosed.

Respectfully submitted,

Date: August 2, 2004

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08/06/2004 MBERHE 00000086 09261329
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PATENT

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APPEAL BRIEF

Mail Stop Appeal Brief - Patents
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Alexandria, VA 22313-1450

Sir:

Applicants hereby appeal from the final rejection of claims 204-206, all the claims pending in the present application.

I. REAL PARTY IN INTEREST

The name of the real party in interest in this appeal is Novozymes A/S.

II. RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences relating to the instant application.

III. STATUS OF THE CLAIMS

Claims 204-206 remain pending in the application. Claims 1-203 have been canceled. All pending claims (a copy of which is provided in the attached Appendix) are included in this appeal.

IV. STATUS OF AMENDMENTS

The amendment filed under 37 C.F.R. § 1.116 on March 31, 2004 was considered, but has been stated as not overcoming the final rejection.

V. SUMMARY OF THE INVENTION

The claimed invention relates to modified cellulases having endoglucanase activity, comprising a substitution of the amino acid at position 119 with H in the amino acid sequence of

SEQ ID NO: 5. Preferably, the modified cellulase consists of a substitution of the amino acid at position 119 with H in the amino acid sequence of SEQ ID NO: 5. In another preferred embodiment, the modified cellulases further comprise one or more specific substitutions at positions 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 18, 19, 20, 21, 21a, 42, 44, 45, 47, 48, 49, 49a, 49b, 74, 82, 95j, 110, 111, 113, 114, 115, 116, 121, 123, 129, 131, 132, 133, 145, 146, 147, 150b, 178, and/or 179.

As described in the specification, e.g., at page 5, line 39 – page 7, line 12, the positions recited in the claims are numbered according to the amino acid sequence of the *Humicola insolens* cellulase of SEQ ID NO: 1. In order to identify a corresponding position in another cellulase, e.g., the cellulase of SEQ ID NO: 5, the two amino acid sequences are aligned (see Table 1 at pages 7-11) and then the corresponding position in the cellulase of SEQ ID NO: 5 is determined. The cellulase of SEQ ID NO: 1 has 202 amino acids, whereas the cellulase of SEQ ID NO: 5 has 201 amino acids. As shown in Table 1, when the two cellulases are aligned, the cellulase of SEQ ID NO: 5 does not have an amino acid at the position corresponding to position 49 of SEQ ID NO: 1. This means that positions 1-48 of the cellulase of SEQ ID NO: 5 correspond to positions 1-48, respectively, of the cellulase of SEQ ID NO: 1 and that positions 49-201 of the cellulase of SEQ ID NO: 5 correspond to positions 50-202, respectively, of the cellulase of SEQ ID NO: 1.

VI. ISSUES

The outstanding issues are:

1. Whether claims 204 and 206 comply with the written description requirement under 35 U.S.C. § 112, first paragraph.

2. Whether claims 204 and 206 comply with the enablement requirement under 35 U.S.C. § 112, first paragraph.

3. Whether claims 204-206 are indefinite under 35 U.S.C. § 112, second paragraph.

VII. GROUPING OF CLAIMS

For purposes of determining patentability, claims 204 and 206 are grouped together, and are addressed separately from claim 205.

VIII. ARGUMENTS

A. Claims 204 and 206 Comply With The Written Description Requirement

1. The Rejection

Claims 204 and 206 are rejected under the written description requirement for the reasons set forth in the office action mailed October 3, 2003:

> Claim[s 204 and 206 are] directed to a genus of cellulases of [SEQ ID NO: 5] having endoglucanase activity comprising one or more mutations at the specific position[ ] corresponding to positions of SEQ ID NO: 1. Because 'comprising' is open language and 'one or more' does not limit the number of mutations, the claim does not impose any structural limitations and reads on any structure that is not necessarily homologous with SEQ ID NO: 1 or SEQ ID NO: 5.
>
> ***
>
> The genus of modified endoglucanases comprises variants additionally mutated at any of said 200 amino acids. Therefore, many functionally and structurally unrelated proteins are encompassed within the scope of these claims, including partial amino acid sequences. Moreover, the specification fails to describe any other representative species by any identifying characteristics or properties other than the functionality. This is insufficient to put one of skill in the art in possession of the attributes and features of all species within the claimed genus. Given this lack of description of representative species encompassed by the genus of the claim, the specification fails to sufficiently describe the claimed invention in such full, clear, concise, and exact terms that a skilled artisan would recognize that applicants were in possession of the claimed invention.

2. The Legal Standard

Section 112, first paragraph provides that:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same....

The written description requirement of 35 U.S.C. § 112, first paragraph, is fulfilled when the patent specification describes the claimed invention in sufficient detail such that the claim limitations are described so that one of skill in the art would recognize that the applicants had invented the subject matter. See *Vas-Cath, Inc. v. Mahurkar*, 19 U.S.P.Q.2d 1111, 1116 (Fed. Cir. 1991); *In re Herschler*, 591. F.2d 693, 700 (C.C.P.A. 1979). The written description as filed is presumed to be adequate, unless or until sufficient evidence or reasoning to the contrary has been presented by the examiner to rebut the presumption. See *In re Marzocchi*, 169 U.S.P.Q. 367 (CCPA 1971).

The written description requirement can be met by showing that an invention is complete by disclosure of sufficiently detailed, relevant identifying characteristics, i.e., complete or partial structure, other physical and/or chemical properties, functional characteristics when coupled with known or disclosed correlation between function and structure, or some combination of such characteristics. See, e.g., *University of California v. Eli Lilly and Co.*, 43 U.S.P.Q.2d 1398, 1404 (Fed. Cir. 1997); *Enzo Biochem v. Gen-Probe Inc.*, 63 U.S.P.Q.2d 1609, 1613 (Fed. Cir. 2002). A description of a claimed genus may be achieved by recitation of a representative number of species falling within the scope of the genus or by a recitation of structural features common to the members of the genus which constitute a substantial portion of the genus. See *University of California v. Eli Lilly and Co.*, 43 U.S.P.Q.2d at 1569.

The Patent Office's "Guidelines for the Examination of Patent Applications Under The 35 U.S.C. § 112, ¶ 1 'Written Description' Requirement" also provide guidance as to how to determine if there is sufficient written description to inform the artisan that the applicant was in possession of the claimed genus at the time the application was filed. These guidelines reiterate the Federal Circuit's law that the written description requirement for a claimed genus may be satisfied through sufficient description of a representative number of species by relevant identifying characteristics, i.e., structure or other physical and/or chemical characteristics, by functional characteristics coupled with a known or disclosed correlation between function and structure, or by a combination of such identifying characteristics, sufficient to show the applicant was in possession of the claimed genus. In particular, the PTO has determined that the written description requirement can be met by "show[ing] that an invention is complete by disclosure of sufficiently detailed, relevant identifying characteristics ... i.e., complete or partial structure, other physical and/or chemical properties, functional characteristics when coupled with a known or disclosed correlation between function and structure, or some combination of such characteristics." Guidelines for Examination of Patent Applications under the 35 U.S.C. § 112, ¶ 1 "Written Description" Requirement, 66 Fed. Reg. 1099, 1106 (Jan. 5, 2001). The Written Description Guidelines also state that a representative number of species requires that the species which are expressly described be representative of the entire genus. The Written Description Guidelines further state that what constitutes a representative number is an inverse function of the predictability of the art.

3. Argument

The claimed invention is drawn to modified cellulases of SEQ ID NO: 5, comprising a substitution of the amino acid at position 119 with H, wherein the variant has endoglucanase

activity. Thus, the claims require that (1) the parent cellulase is the cellulase of SEQ ID NO: 5, (2) the modified cellulase comprises a specific substitution at a specific position, and (3) the modified cellulase has endoglucanase activity. Because of these claim requirements, the claims provide structural limitations on the modified cellulases of the present invention.

Moreover, the specification specifically describes a number of other positions and mutations, which can be combined with the claimed substitution. For example, the variants may further comprise any of the substitutions recited in claim 206. Moreover, the specification describes at pages 22-24 the introduction of disulfide bridges and mutations in the substrate binding cleft to stabilize the parent cellulase. Examples of such mutations are provided in Tables 4-6 at pages 28-35 of the specification. Tables 5 and 6 also disclose the effect of the specific mutations, where 1) indicates increased catalytic activity, 2) indicates altered sensitivity to anionic tensides, and 3) indicates altered pH optimum. Finally, the specification discloses at pages 35-38 specific mutations which result in increased stability towards anionic tensides, which are commonly used in detergent compositions.

Thus, the Examiner is incorrect that the specification fails to describe any other species. Contrary to the Examiner's allegations, the specification discloses numerous modified cellulases of the present invention and evidences that Applicants possessed these species. These species are a representative number of species within the scope of the genus and therefore Applicants' disclosure evidences that Applicants were in possession of the claimed genus of modified cellulases at the time the application was filed.

Moreover, the level of skill in the art of enzyme variants is very high. Indeed, there are numerous U.S. patents on cellulase variants comprising a mutation at one or more positions. Examples of recently-issued U.S. patents are U.S. Patent Nos. 5,792,641, 6,114,296, 6,117,664, 6,187,732, and 6,268,328. It would be routine for one of ordinary skill in the art to combine the substitution recited in claim 204 of the present application with any of the mutations described in the prior art. Applicants note that the claims of <u>all</u> of these patents use the transition term "comprising". Copies of U.S. Patent No. 6,268,328 as well as two other U.S. patents (U.S. Patent Nos. 6,117,664 and 6,682,924), which claim enzyme variants <u>comprising</u> one or more mutations, are enclosed herewith.

In sum, Applicants' specification provides (1) a precise definition by structure of the genus of modified cellulases sufficient to distinguish it from other modified cellulases and (2) a description of numerous representative members of the genus, in sufficient detail so that one of skill in the art would recognize that Applicants had invented the claimed subject matter. Accordingly,

Applicants respectfully submit that the rejection of claims 204 and 206 as failing to comply with the written description requirement is improper and should be reversed.

B. Claims 204 and 206 Comply With The Enablement Requirement

1. The Rejection

Claims 204 and 206 are rejected under the enablement requirement for the reasons set forth in the office action mailed October 3, 2003:

> Claims [204 and 206] are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a modified endoglucanase having the structure of SEQ ID NO: 5 mutated at a single position corresponding to residue 119 in SEQ ID NO: 1, does not reasonably provide enablement for a modified endoglucanase of SEQ ID NO: 5 comprising said specific mutation. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.
>
> * * *
>
> Claim[s 204 and 206 are] directed to a genus of modified endoglucanases comprising one or more specific mutations. Because 'comprising' is open language the claim does not impose any structural limitations and reads on any structure that is not necessarily homologous with SEQ ID NO: 5. Therefore, the breadth of these claims is much larger than the scope enabled by the specification.
>
> The state of the art does not allow the predictability of the properties based on the structure. The specification does not teach which residues besides the specifically mutated are responsible for the resulting properties of the mutant. The scope of the claims is not commensurate with the enablement provided by the disclosure with regard to the extremely large number of endoglucanases broadly encompassed by the claims. Since the amino acid sequence of a protein determines its structural and functional properties, predictability of which changes can be tolerated in a protein's amino acid sequence and obtain the desired properties/activity requires a knowledge of and guidance with regard to which amino acids in the protein's sequence, if any, are tolerant of modification and which are conserved (i.e. expectedly intolerant to modification), and detailed knowledge of the ways in which the protein's structure relates to its function. However, in this case the disclosure is limited to the nucleotide and amino acid sequence of a mutant with a substitution at a single position.
>
> While recombinant and mutagenesis techniques are known, it is not routine in the art to screen for multiple substitutions or multiple modifications, as encompassed by the instant claims, and the positions within a protein's sequence where amino acid modifications can be made with a reasonable expectation of success in obtaining the desired activity/utility are limited in any protein and the result of such modifications is unpredictable. In addition, one skilled in the art

would expect any tolerance to modification for a given protein to diminish with each further and additional modification, e.g. multiple substitutions.

2. The Legal Standard

Section 112 of U.S. Patent Code requires that the specification be "enabling" to a person skilled in the art to which the invention pertains. "A specification disclosure which contains a teaching of the manner and process of making and using the invention in terms which corresponds in scope to those used in describing and defining the subject matter sought to be patented must be taken as in compliance with the enabling requirement of the first paragraph of section 112 unless there is reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support." *In re Marzocchi*, 169 USPQ at 369.

It is also well settled that an assertion by the Patent Office that the enabling disclosure is not commensurate in scope with the protection sought must be supported by evidence or reasoning substantiating the doubts so expressed. *In re Dinh-Nguyen*, 181 U.S.P.Q. 46 (C.C.P.A. 1974). See also *U.S. v. Telectronics*, 8 U.S.P.Q.2d 1217 (Fed. Cir. 1988); I*n re Bowen*, 181 U.S.P.Q. 48 (C.C.P.A. 1974); *Ex parte Hitzeman*, 9 U.S.P.Q.2d 1821 (BPAI 1988). In the absence of any evidence or apparent reason why compounds do not possess the disclosed utility, the allegation of utility in the specification must be accepted as correct. *In re Kamal*, 158 U.S.P.Q. 320 (C.C.P.A. 1968). See also *In re Stark*, 172 U.S.P.Q. 402, 406 n. 4 (C.C.P.A. 1972) (the burden is upon the Patent Office to set forth reasonable grounds in support of its contention that a claim reads on inoperable subject matter).

Enablement requires that the specification teach those in the art to make and use the invention without undue experimentation. *In re Wands*, 8 USPQ2d 1400 (Fed. Cir. 1988). As stated in Wands, [w]hether undue experimentation is needed is not a single, simple factual determination, but rather is a conclusion reached by weighing many factual considerations." See id. at 1404. The Wands factors which may be relevant for determining whether a disclosure would require undue experimentation include (1) the quantity of experimentation necessary; (2) the amount of direction or guidance presented; (3) the presence or absence of working examples; (4) the nature of the invention; (5) the state of the prior art; (6) the relative skill of those in the art; (7) the predictability or unpredictability of the art; and (8) the breadth of the claims. Id.

In *In re Angstadt*, 190 U.S.P.Q. 214 (C.C.P.A. 1976), the claimed process of preparing hydroperoxides used a metal salt complex as a catalyst. The specification disclosed catalysts that worked and some that gave little or no yield of hydroperoxides. The claims were rejected for

lack of enablement, specifically as requiring undue experimentation to find useful catalysts. This rejection was reversed by the CCPA.

In holding that the claims did satisfy 35 U.S.C. 112, the Court observed, 190 U.S.P.Q. at 218:

> We cannot agree with the board that appellants' disclosure is not sufficient to enable one of ordinary skill in the art to practice the invention without undue experimentation. We note that many chemical processes, and catalytic processes particularly, are unpredictable, [citation omitted] and that the scope of enablement varies inversely with the degree of unpredictability involved, [citation omitted]. That this particular process is unpredictable is demonstrated further by appellants in their specification. Appellants have disclosed forty examples; one of these examples yields no hydroperoxides in the final product. Also, appellants have expressly indicated in their specification that some of these organometallic complex catalysts 'yield *** no hydroperoxides in the final product.'
>
> Appellants have apparently not disclosed every catalyst which will work; they have apparently not disclosed every catalyst which will not work. The question, then, is whether in an unpredictable art, section 112 requires disclosure of a test with every species covered by a claim. To require such a complete disclosure would apparently necessitate a patent application or applications with 'thousands' of catalysts along with information as to whether each exhibits catalytic behavior resulting in the production of hydroperoxides. More importantly, such a requirement would force an inventor seeking adequate patent protection to carry out a prohibitive number of actual experiments. This would tend to discourage inventors from filing patent applications in an unpredictable area since the patent claims would have to be limited to those embodiments which are expressly disclosed. A potential infringer could readily avoid 'literal' infringement of such claims by merely finding another analogous catalyst complex which could be used in 'forming hydroperoxides.'

The Court, 190 U.S.P.Q. at 218, recognized that some experimentation might be necessary for the skilled worker to select non-exemplified catalysts for use:

> Appellants have, in effect, provided those skilled in this art with a large but finite list of transition metal salts from which to choose in preparing such a complex catalyst. Appellants have actually carried out 40 runs using various transition metal salts and hexaalkylphosphoramides. If one skilled in this art wished to make and use a transition metal salt other than those disclosed in appellants' 40 runs, he would merely read appellants' specification for directions how to make and use the catalyst complex to oxidize the alkylaromatic hydrocarbons, and could then determine whether hydroperoxides are, in fact, formed. The process discovered by appellants is not complicated, and there is no indication that special equipment or unusual reaction conditions must be provided when practicing the invention. One skilled in this art would merely have to substitute the correct mass of a transition metal salt for the transition metal salts disclosed in appellants' 40 runs. Thus, we have no basis for concluding that persons skilled in this art, armed with the specification and its 40 working examples, would not

> easily be able to determine which catalyst complexes within the scope of the claims work to produce hydroperoxides and which do not.

However, while some experimentation might be necessary, as long as the experimentation was not "undue experimentation," the claims would not violate 35 U.S.C. 112, *Angstadt*, Id.

> Since appellants have supplied the list of catalysts and have taught how to make and how to use them, we believe that the experimentation required to determine which catalysts will produce hydroperoxides would not be undue and certainly would not 'require ingenuity beyond that to be expected of one of ordinary skill in the art.' (Emphasis added).

3. Argument

As discussed above, the claimed invention is drawn to modified cellulases of SEQ ID NO: 5, comprising a substitution of the amino acid at position 119 with H, wherein the variant has endoglucanase activity. Thus, the claims require that (1) the parent cellulase is the cellulase of SEQ ID NO: 5, (2) the modified cellulase comprises a specific substitution at a specific position, and (3) the modified cellulase has endoglucanase activity. Because of these claim requirements, the claims provide structural limitations on the modified cellulases of the present invention.

Moreover, as stated above, the specification specifically describes a number of other positions and mutations, which can be combined with the claimed substitution. For example, the variants may further comprise any of the substitutions recited in claim 206. Moreover, the specification describes at pages 22-24 the introduction of disulfide bridges and mutations in the substrate binding cleft to stabilize the parent cellulase. Examples of such mutations are provided in Tables 4-6 at pages 28-35 of the specification. Tables 5 and 6 also disclose the effect of the specific mutations, where 1) indicates increased catalytic activity, 2) indicates altered sensitivity to anionic tensides, and 3) indicates altered pH optimum. Finally, the specification discloses at pages 35-38 specific mutations which result in increased stability towards anionic tensides, which are commonly used in detergent compositions.

Thus, the specification discloses a large number of modified cellulases of the present invention, and illustrates how the cellulases are made and used. While some experimentation might be necessary to identify other non-exemplified modified cellulases, such experimentation would require carrying out a simple process without special equipment or unusual reaction conditions. This experimentation, if required, would not be undue and certainly would not

require ingenuity beyond that expected of one of ordinary skill in the art. Certainly, there is no evidence of record to the contrary.

Moreover, the level of skill in the art of enzyme variants is very high. Indeed, there are numerous U.S. patents on cellulase variants comprising a mutation at one or more positions. Examples of recently-issued U.S. patents are U.S. Patent Nos. 5,792,641, 6,114,296, 6,117,664, 6,187,732, and 6,268,328. It would be routine for one of ordinary skill in the art to combine the substitution recited in claim 204 of the present application with any of the mutations described in the prior art.

In sum, the specification contains a teaching of the manner and process of making and using the invention in terms which corresponds in scope to the claimed subject matter.

The Examiner's allegation that "While recombinant and mutagenesis techniques are known, it is not routine in the art to screen for multiple substitutions or multiple modifications, as encompassed by the instant claims" is incorrect. This contention may have been true many years ago, however, it is certainly not the case as of the effective filing date of this application. As of September 1996, persons of ordinary skill in the art were able to routinely produce thousands of mutants of SEQ ID NO: 1 through mutagenesis and other techniques in a short period of time.

Accordingly, the specification contains an enabling disclosure of the manner of making and using the invention which corresponds in scope to the claimed subject matter. Applicants therefore request that the rejection under the enablement requirement be reversed.

C. Claims 204-206 Comply With 35 U.S.C. § 112, Second Paragraph

1. The Rejection

In the Advisory Action mailed April 13, 2004, the Examiner objected to the phrase "wherein each position is numbered according to the amino acid sequence of the cellulase of SEQ ID NO: 1" recited in claim 204 as follows:

> It is unclear how position in SEQ ID NO: 5 are numbered according to SEQ ID NO: 1. In other words, why modifications at various positions of SEQ ID NO: 5 have to be numbered not as positions of SEQ ID NO: 5 but as positions of SEQ ID NO: 1. Position 119 in SEQ ID NO: 5 means position 119 according to SEQ ID NO: 5. However, in the instant case it should be position 118 of SEQ ID NO: 5.

2. The Legal Standard

Under 35 U.S.C. § 112, second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

The test for determining whether a claim complies with the definiteness requirement is whether "those skilled in the art would understand what is claimed when the claim is read in light of the specification." *Morton International, Inc. v. Cardinal Chemical Co.*, 28 U.S.P.Q.2d 1190, 1994 (Fed. Cir. 1993). See also *Miles Laboratories, Inc. v. Shandon Inc.*, 27 U.S.P.Q.2d 1123, 1126 (Fed. Cir. 1993) ("The 'distinctly claiming' requirement means that the claims must have a clear and definite meaning when construed in the light of the complete patent document.... Section 112 thus ensures definiteness of claim language.... The test for definiteness is whether one skilled in the art would understand the bounds of the claim when read in light of the specification.... If the claims read in light of the specification reasonably apprise those skilled in the art of the scope of the invention, § 112 demands no more....").

It is also well settled that a patentee may act as his own lexicographer and expressly define terms in the specification. See, e.g., *Housey Pharmaceuticals Inc. v. Astra Zeneca UK Ltd.*, 70 U.S.P.Q. 1641, 1644 (Fed. Cir. 2004).

3. Argument

Claim 204 reads as follows:

> 204. A modified cellulase, comprising a substitution of the amino acid at position 119 with H in the amino acid sequence of SEQ ID NO: 5, wherein each position is numbered according to the amino acid sequence of the cellulase of SEQ ID NO: 1 and the modified cellulase has endoglucanase activity.

As discussed in Section V above, the specification describes at, e.g., page 5, line 39 – page 7, line 12, that the positions recited in the claims are numbered according to the amino acid sequence of the *Humicola insolens* cellulase of SEQ ID NO: 1. In order to identify a corresponding position in another cellulase, e.g., the cellulase of SEQ ID NO: 5, the two amino acid sequences are aligned (see Table 1 at pages 7-11). The cellulase of SEQ ID NO: 1 has 202 amino acids, whereas the cellulase of SEQ ID NO: 5 has 201 amino acids. As shown in Table 1, when the two cellulases are aligned, the cellulase of SEQ ID NO: 5 does not have an amino acid at the position corresponding to position 49 of SEQ ID NO: 1. This means that positions 1-48 of the cellulase of

SEQ ID NO: 5 correspond to positions 1-48, respectively, of the cellulase of SEQ ID NO: 1 and that positions 49-201 of the cellulase of SEQ ID NO: 5 correspond to positions 50-202, respectively, of the cellulase of SEQ ID NO: 1.

Based on Applicants' disclosure, one of ordinary skill in the art would know how to align the amino acid sequence of another cellulase and the cellulase of SEQ ID NO: 1 and then be able to determine the positions in other cellulases corresponding to the positions of the cellulase of SEQ ID NO: 1. Therefore, the claims, read in the light of the specification, reasonably apprise those skilled in the art of the scope of the invention and provide clear warning to persons in the art of what will constitute infringement.

Moreover, an applicant has the right to be his own lexicographer. Thus, an Examiner cannot require an applicant to use claim language which she prefers, e.g., to recite the positions according to the amino acid sequence of SEQ ID NO: 1, as long as the claims satisfy the definiteness requirement.

Further evidence that the claim language is clear and definite is the following statement at page 10 of the Office Action mailed October 3, 2003:

> Claim 203 rewritten to be drawn to a mutant with a single mutation Q118H in SEQ ID NO: 5 would be allowable. Q118H in SEQ ID NO: 5 corresponds to Q119H in SEQ ID NO: 1.

For the foregoing reasons, Applicants submit that the claims are clear and definite and request that the rejection be reversed.

IX. CONCLUSION

For the foregoing reasons, the claims comply with the written description, enablement and definiteness requirements. Accordingly, the final rejection of the claims should be reversed.

Respectfully submitted,

Date: August 2, 2004

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APPENDIX

Copy of Claims Involved in the Appeal

204. A modified cellulase, comprising a substitution of the amino acid at position 119 with H in the amino acid sequence of SEQ ID NO: 5, wherein each position is numbered according to the amino acid sequence of the cellulase of SEQ ID NO: 1 and the modified cellulase has endoglucanase activity.

205. The modified cellulase of claim 204, wherein the substitution consists of Q119H.

206. The modified cellulase of claim 204, further comprising
a substitution of the amino acid at position 4 with H, K, M, Q, R, V, or Y;
a substitution of the amino acid at position 5 with S or T;
a substitution of the amino acid at position 6 with T;
a substitution of the amino acid at position 7 with I, K, L, R, or W;
a substitution of the amino acid at position 8 with Y;
a substitution of the amino acid at position 9 with W or Y;
a substitution of the amino acid at position 10 with D;
a substitution of the amino acid at position 12 with G or M;
a substitution of the amino acid at position 13 with K, L, or Q;
a substitution of the amino acid at position 14 with A, P, or T;
a substitution of the amino acid at position 15 with H, S, or T;
a substitution of the amino acid at position 16 with A, C, or M;
a substitution of the amino acid at position 18 with F or Y;
a substitution of the amino acid at position 19 with A, D, E, G, P, S, or T;
a substitution of the amino acid at position 20 with A, E, G, or K;
a substitution of the amino acid at position 21 with K or N;
a substitution of the amino acid at position 21a with V;
a substitution of the amino acid at position 42 with D, G, K, N, S, T, W, or Y;
a substitution of the amino acid at position 44 with G, K, P, Q, or V;
a substitution of the amino acid at position 45 with S or T;
a substitution of the amino acid at position 47 with C, G, M, or Q;
a substitution of the amino acid at position 48 with E, N, or S;
a substitution of the amino acid at position 49 with A, G, P, or S;

a substitution of the amino acid at position 49a with C;
a substitution of the amino acid at position 49b with N;
a substitution of the amino acid at position 74 with A or F;
a substitution of the amino acid at position 82 with E;
a substitution of the amino acid at position 95j with P;
a substitution of the amino acid at position 110 with S;
a substitution of the amino acid at position 111 with I, T, or V;
a substitution of the amino acid at position 113 with G or Y;
a substitution of the amino acid at position 114 with N;
a substitution of the amino acid at position 115 with L;
a substitution of the amino acid at position 116 with S;
a substitution of the amino acid at position 121 with D;
a substitution of the amino acid at position 123 with A, M, or Q;
a substitution of the amino acid at position 129 with L or V;
a substitution of the amino acid at position 131 with A or I;
a substitution of the amino acid at position 132 with A, D, P, or T;
a substitution of the amino acid at position 133 with D, K, or N;
a substitution of the amino acid at position 145 with A, D, N, or Q;
a substitution of the amino acid at position 146 with R;
a substitution of the amino acid at position 147 with C, G, K, R, V, or W;
a substitution of the amino acid at position 150b with A;
a substitution of the amino acid at position 178 with D, N, or P; or
a substitution of the amino acid at position 179 with N or V.